

1. A method for precision cutting belt material for the formation of a puzzle cut joint in the construction of a continuous belt for use in document processing machines, comprising the steps of:

registering a belt material in operative position with a precision cutter;
securing said belt material in said operative position;
controlling said precision cutter to accurately cut said belt material to its final dimensions;

releasing said belt material and securing said belt material on a transport mechanism by means of a vacuum pickup;

transporting said belt material from said precision cutter to a punch press having first and second punch and die sets;

monitoring the position of said belt material relative to said first and second die sets and generating a signal relative thereto;

adjusting the position of the belt material relative to said first and second die sets for accurate registration therewith; and

controlling the operation of said first and second punch and die sets in response to said position signals to cut mating shapes to form said puzzle cut joint.

2. A method for precision cutting belt material for the formation of a puzzle cut joint in the construction of a continuous belt for use in document processing machines, according to claim 1, wherein the step of registering is accomplished by sensing the position of the belt material and adjusting the position of the belt material in accurate registration with the precision cutter.

3. A method for precision cutting belt material for the formation of a puzzle cut joint in the construction of a continuous belt for use in document processing machines, according to claim 1, wherein the step of securing said belt material in operative position with said precision cutter is accomplished by applying a vacuum to said belt material through a supporting table.

4. A method for precision cutting belt material for the formation of a puzzle cut joint in the construction of a continuous belt for use in document processing machines, according to claim 3, wherein said application of vacuum is controlled by said process controller to secure the belt material in at least two steps, a first step in which the force exerted on said belt material is adjusted to allow limited movement of the belt material to adjust the position thereof relative to said precision cutter, and a second step in which the force exerted on said belt material prevents movement of the belt material with respect to said precision cutter.

5. A method for precision cutting belt material for the formation of a puzzle cut joint in the construction of a continuous belt for use in document processing machines, according to claim 3, wherein said vacuum pickup is controlled to engage the belt material after said belt material is cut and further wherein said source of vacuum for securing said belt material relative to said precision cutter is reversed as said source of vacuum for said vacuum pickup is applied.

6. A method for precision cutting belt material for the formation of a puzzle cut joint in the construction of a continuous belt for use in document processing machines, according to claim 1, wherein said vacuum pickup applies vacuum through a continuous slot to form a vacuum engagement of the belt material along a straight line.

7. A method for precision cutting belt material for the formation of a puzzle cut joint in the construction of a continuous belt for use in document processing machines, according to claim 1, further comprising the steps of:

transporting said belt material from said precision cutter to one of said first and second punch and die sets for cutting a mating portion of said puzzle cut joint on one end of said belt material; and

then transporting said belt material to the other of said first and second punch and die sets for cutting another mating portion of said puzzle cut joint on another end of said belt material.

8. A method for precision cutting belt material for the formation of a puzzle cut joint in the construction of a continuous belt for use in document processing machines, according to claim 7, wherein the step of monitoring the position of said belt material relative to said punch and die sets is accomplished by positioning first and second optical sensors adjacent said first and second punch and die sets respectively.

9. A method for precision cutting belt material for the formation of a puzzle cut joint in the construction of a continuous belt for use in document processing machines, according to claim 8, wherein the step of monitoring the position of said belt material relative to said punch and die sets is accomplished at each location, by said first and second optical sensors and adjusted, if necessary, prior to the operation of said punch and die sets.

10. A method for precision cutting belt material for the formation of a puzzle cut joint in the construction of a continuous belt for use in document processing machines, according to claim 9, wherein said step of monitoring the position of said belt material relative to said punch and die sets includes positioning said first and second sensors to detect the position of a corner of said belt material relative to said respective punch and die set.

11. A method for precision cutting belt material for the formation of a puzzle cut joint in the construction of a continuous belt for use in document processing machines, according to claim 1, wherein the step of securing the belt material includes adjusting the position of said vacuum pickup to maintain the belt material in a tensioned condition during the operation of said punch press.

12. A method for precision cutting belt material for the formation of a puzzle cut joint in the construction of a continuous belt for use in document processing machines, according to claim 1, further comprising the step of pivoting the outer most vacuum bar out of the way of said respective punch and die sets, prior to actuation of the punch press.